

Date: Monday, 5/7/2007 9:57:15 AM
 User: Kim Johnston

Process Sheet

Customer	CU-DAR001 Dart Helicopters Services		Drawing Name	HIGH AFT X-TUBE 412	
Job Number	32229		Part Number	D412664203	
Estimate Number	10559		Drawing Number	D412-664-243 REV D	
P.O. Number	N/A		Project Number	N/A	
This Issue	5/7/2007	S.O. No.	N/A	Drawing Revision	D
Prsht Rev.	NC	Type	LANDING GEAR	Material	N/A
First Issue	N/A			Due Date	6/10/2007
Previous Run	32228			Qty:	1
Written By					
Checked & Approved By	<u>CH 07.05.07</u>				
Comment	Est Rev:E 04.02.16 Rerformat; Added D3189-1 K/DS Est Rev:F 06-03-29 Remove Comments on Pick List JLM Est Rev:G 06.12.08 per ECN 886 EC Est Rev:H 07-04-30 As per Rev D JLM				

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
1.0	DC	DOCUMENT CONTROL  Comment: DOCUMENT CONTROL Photocopy bluefile and create labels as per PPP D412-664-203 CHG 006 <i>J KS 07.05.30</i>
2.0	D6009129	Crosstube Material  Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s) Pick: Qty Part number Description Batch 1 D6009-129 Crosstube <u>Z65481</u> Check OD = 3.500"; ID = 2.250" <i>8/07/06/07 36 07.06.08</i>
3.0	MORI SEIKI	MORI SEIKI CNC LATHE LARGE  Comment: MORI SEIKI CNC LATHE LARGE 1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA166 2-Turn first side as per Folio FA166 <i>8/02/06/07</i> 3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243. <i>36 07.06.06</i>
4.0	QC1	INSPECT ALL DIM TO DIM SHEET  Comment: INSPECT ALL DIM TO DIM SHEET <i>36 07.06.06</i>

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
 QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Monday, 5/7/2007 9:57:15 AM
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Process Sheet

Customer: CU-DAR001 Dart Helicopters Services		Drawing Name: HIGH AFT X-TUBE 412
Job Number: 32229		Part Number: D412664203
Job Number:		
Seq. #:	Machine Or Operation:	Description :
5.0	MORI SEIKI	MORI SEIKI CNC LATHE LARGE
Comment: MORI SEIKI CNC LATHE LARGE		
1-Turn second side as per Folio FA166		
2-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243.		
3- Remove sand and plugs		
4-Scribe part # and batch # using vibrating stylus as per Dwg D412-664-243 Cuff(Donot engrave on outside of tube) Inside of 		
6.0	QC1	INSPECT ALL DIM TO DIM SHEET
Comment: INSPECT ALL DIM TO DIM SHEET		
7.0	QC8	SECOND CHECK
Comment: SECOND CHECK		
8.0	LANDING GEAR 1	LANDING GEAR RESOURCE 1
Comment: LANDING GEAR RESOURCE 1		
1-Polish entire outside surface of crosstube		
9.0	QC5	INSPECT WORK TO CURRENT STEP
Comment: INSPECT WORK TO CURRENT STEP		
10.0	HAND FINISHING1	HAND FINISHING RESOURCE #1
Comment: HAND FINISHING RESOURCE #1 Chemical Conversion Coat as per QSI 005 4.1		
11.0	QC3	INSPECT POWDER COAT/CHEMICAL CONVERSION
Comment: Inspect work & Chemical conversion Coat		

W/O:		WORK ORDER CHANGES					
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Drawing Name: HIGH AFT X-TUBE 412

Job Number: 32229

Part Number: D412664203

Job Number:



Seq. #: Machine Or Operation:

Description :

12.0 BENDING BENDING MACHINE



Comment: BENDING MACHINE

Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010

EL 7-7-18

13.0 QC15 DIMENSIONAL CHECK OF X-TUBES



En 07/07/18 ⑩

Comment: DIMENSIONAL CHECK OF X-TUBES

14.0 LANDING GEAR 1 LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551

2-Ream hole to finish size in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243

⑩ 07/07/18
JN 7-7-23

15.0 HAND FINISHING1 HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

JN 7-7-23

16.0 QC3 INSPECT POWDER COAT/CHEMICAL CONVERSION



En 07/07/24 ⑩

Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION.

17.0 QC5 INSPECT WORK TO CURRENT STEP



En 07/07/24 ⑩

Comment: INSPECT WORK TO CURRENT STEP

18.0 OUTSIDE SERV.10 OUTSIDE SERVICES -LG



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 0380R

Issue P/O: 4746 LPI as per ASTM 1417

Level 2 Attach copy of NDT results to work order

⑩ 07/07/24 /

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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NOTE: Date & initial all entries

Monday, 5/7/2007 9:57:15 AM

Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: HIGH AFT X-TUBE 412

Job Number: 32229

Part Number: D412664203

Job Number:



Seq. #: Machine Or Operation:

Description :

19.0 PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage

Ensure copy of NDT results attached to work order.

P 07/08/01

20.0 QC5

INSPECT WORK TO CURRENT STEP



Comment: Inspect for damage & ensure results areas per Dwg D412-664-203

21.0 SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

AT 07-08-07

2-Paint outside crosstube with White lbrnol as per QSI 005 4.2

AT 07-08-02

22.0 QC14

INSPECT SPRAY PAINT



PTO

Comment: Inspect Spray Paint

Wrap in plastic bag to protect from scratches

07-08-08

23.0 D3595

Rubber Cushion (per sq ft)



Comment: Qty.: 0.0492 sf(s)/Unit Total : 0.0492 sf(s)

Rubber Cushion (per sq ft)

.630" x5.70" x2pcs

Batch: 33542

AT 07-08-08

24.0 D2856600

Abrasion Strip



Comment: Qty.: 1.7640 f(s)/Unit Total : 1.7640 f(s)

Pick:

Qty Part number Description Batch

2 D2856-600(Cut to 10.090") Abrasion Strip 326650

AT 07-08-08

25.0 D28961

Support



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D2896-1

Support 30200

AT 07-08-08

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
07-08-07	21.0	<ul style="list-style-type: none"> - Strip tube to inspect Surface Polishing detail - Re-polish the tube's surface to ensure Polishing marks are longitudinal along the tube. A locline per QSI 005 - Prime the tubes surface with yellow primer epoxy per QSI 005. 	ZT	07-08-07	1		
			ZT	07-08-07	1	07-08-07	07-08-07
			ZT	07-08-08	1		

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
07-08-07	21.0							

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User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: HIGH AFT X-TUBE 412

Job Number: 32229

Part Number: D412664203

Job Number:



Seq. #: Machine Or Operation:

Description :

26.0 D31891 Chafing Shield



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch
2 D31891 Chafing Shield

32513 RT 07-08-08

27.0 MS2192028 Clamp(per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number Description Batch
4 MS21920-28 Clamp 103896

RT 07-08-08

28.0 MS2192030 clamp(per MIL-DTL-8783C)



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

clamp(per MIL-DTL-8783C)
batch: M100154

RT 07-08-08

29.0 LANDING GEAR 1 LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

Assemble as per Dwg D412-664-203

1-Install supports with magnobond as per QSI 015 Adhere for for 12 Hrs

A/R 6398 Magnobond Batch: 104723

Expiry Date: 08-10-01

RT 07-08-08 100 pm.

2-Install clamps as per Dwg D212-664-141. Torque clamps to 80-100 in lb.

RT 07-08-09

30.0 QC5 INSPECT WORK TO CURRENT STEP



Property

Er 07/08/09 (X)

Comment: INSPECT WORK TO CURRENT STEP

31.0 PACKAGING 1 PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
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Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: HIGH AFT X-TUBE 412

Job Number: 32229

Part Number: D412664203

Job Number:



Seq. #: Machine Or Operation:

Description :

32.0

AN640A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Bolt

Batch: M104374-

10

33.0

AN641A

Bolt



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Bolt

Batch: M100743

10

34.0

AN960JD616

Washer



Comment: Qty.: 18.0000 Each(s)/Unit Total : 18.0000 Each(s)

Washer

Batch: M103677 5X M102829 5X M104374 (13X)

35.0

MS21042L6

Nut



Comment: Qty.: 6.0000 Each(s)/Unit Total : 6.0000 Each(s)

Nut

Batch: M101660

10/18/09 (1)

36.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

37.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D412-664-203

*****Ensure tube is not packaged if curing time is less than 12 hrs, see step 27 for application time & date

Time & date of packaging:

Rev 6

7/8/09 50
epoxy 08/09

Location:

PPP Rev:

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: Date: 01/08/10
 QA: N/C Closed: _____ Date: _____

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Job Number: 32229

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Job Number:

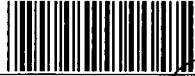


Seq. #: Machine Or Operation:

Description :

38.0 QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

①
D07/08/10

Job Completion



(207/08/10)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	32229
Description: Crosstube Assembly (412 High Aft)	Part Number:	D412-664-243
Inspection Dwg: D412-664-243 Rev: B 084 02.01.07		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

First Article Prototype

Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.684	+0.005/-0.000	2.688			
	2.748	+0.005/-0.000	2.752			
	2.884	+0.005/-0.000	2.888			
	3.019	+0.005/-0.000	3.023			
	3.163	+0.005/-0.000	3.167			
	3.308	+0.005/-0.000	3.312			
	3.429	+0.005/-0.000	3.433			
	2.990	+0.005/-0.000	2.993			
	2.618	+0.005/-0.000	2.622			
	0.200	+/-0.010	.200			
	R0.063	+/-0.010	.063			
	R0.500	+/-0.010	.500			
	4.971	+0.034/-0.001	4.971			
SIDE B	2.684	+0.005/-0.000	2.688			
	2.748	+0.005/-0.000	2.752			
	2.884	+0.005/-0.000	2.888			
	3.019	+0.005/-0.000	3.023			
	3.163	+0.005/-0.000	3.167			
	3.308	+0.005/-0.000	3.312			
	3.429	+0.005/-0.000	3.433			
	2.990	+0.005/-0.000	2.993			
	2.618	+0.005/-0.000	2.622			
	0.200	+/-0.010	.200			
	R0.063	+/-0.010	.063			
	R0.500	+/-0.010	.500			
	4.971	+0.034/-0.001	4.971			
	124.09	+/-0.020	124.09			

Measured by:	36/18	Audited by:		Prototype Approval:	N/A
Date:	07/06/07	Date:	07-06-07	Date:	N/A

Rev	Date	Change	Revised by	Approved
A	04.06.16	New Issue (P/O D412-664-203)	KJ/JLM	
B	06.03.09	Dwg Rev updated	KJ/JLM	JL

DART AEROSPACE LTD

Work Order:

32229

Description: Crosstube High Aft (412)

Part Number:

D412-664-203

Inspection Dwg: D412-664-243

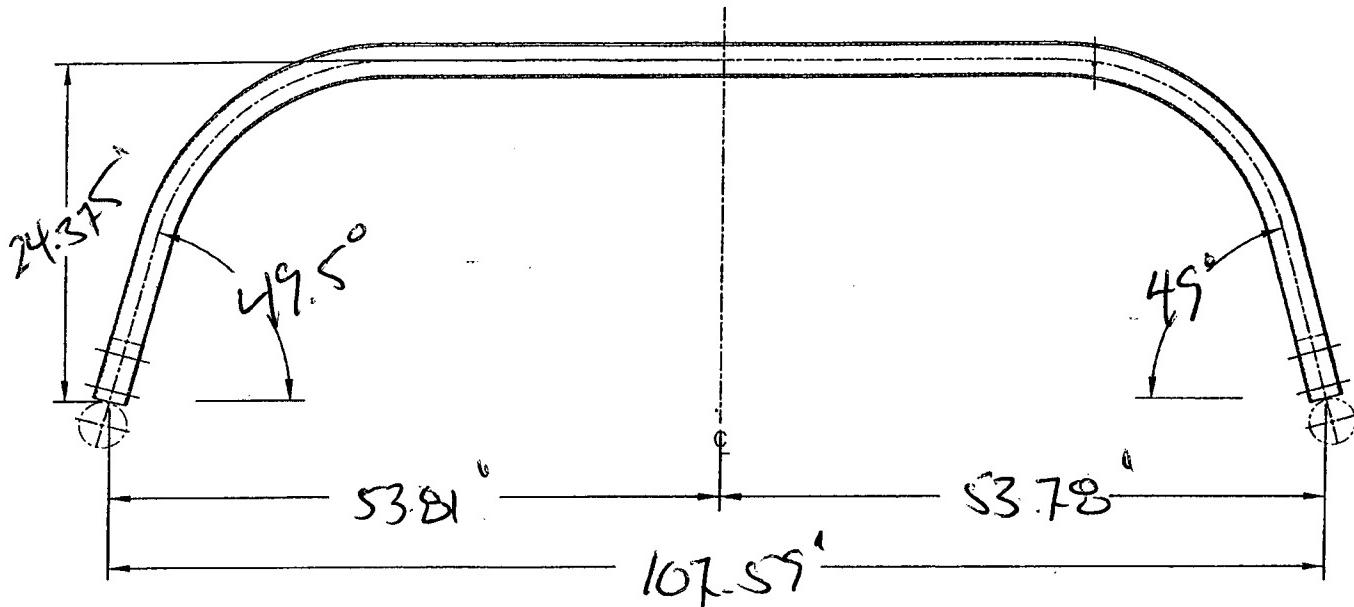
Rev: C

Page 1 of 1

07.04.07

Required Dimension	Min	Max
Height	24.24	24.31
1/2 Span	53.59	53.66
Angle	49	52
Total Span	107.13	107.32

24.50
53.35 } 07.04.07
107.70 }



Comments

QC15 Inspection	S
Date	07/07/18

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	JW

DART

DESIGN <i>PH</i>	DRAWN BY <i>PH</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>GP</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D412-664-243	REV. D SHEET 1 OF 3
DATE 07.03.09		TITLE CROSSTUBE ASSEMBLY (412 HI AFT)	SCALE NTS
A	01.10.17	NEW ISSUE	
B	05.02.04	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	
C	06.10.27	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398 MS21920-32 WAS MS21920-30	
D	07.03.09	REMOVE D2732-058, CHANGE TO D3595-063-570	

RELEASED

07.04.24 - *[Signature]*

Qty	Part Number	Description
X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
1	D6009-129	CROSSTUBE
2	D3595-063-570	RUBBER CUSHION
1	D2896-1	SUPPORT
2	D2856-600-1009	ABRASION STRIP
4	MS21920-28	CLAMP
2	MS21920-30	CLAMP (OR MS21920-32)
2	D3189-1	CHAFING SHIELD
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

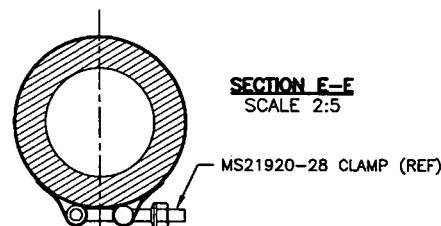
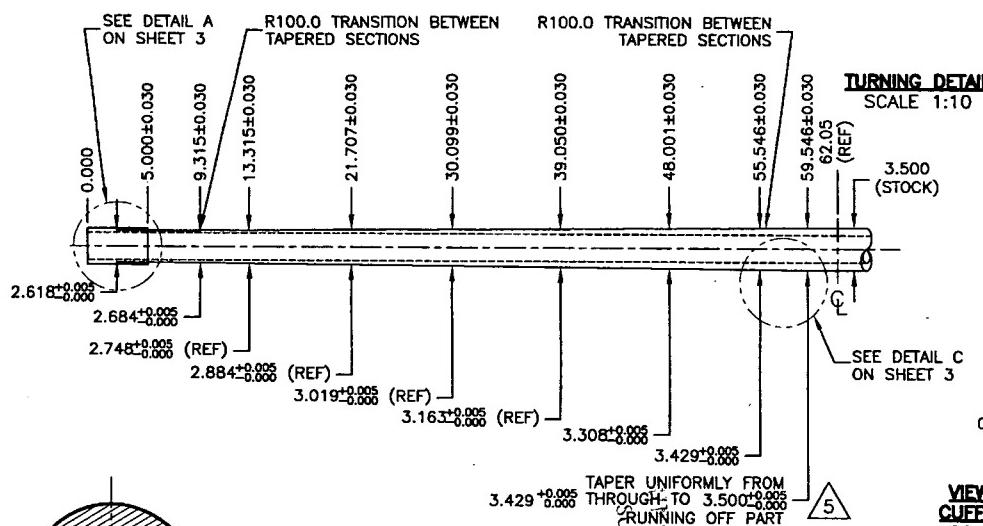
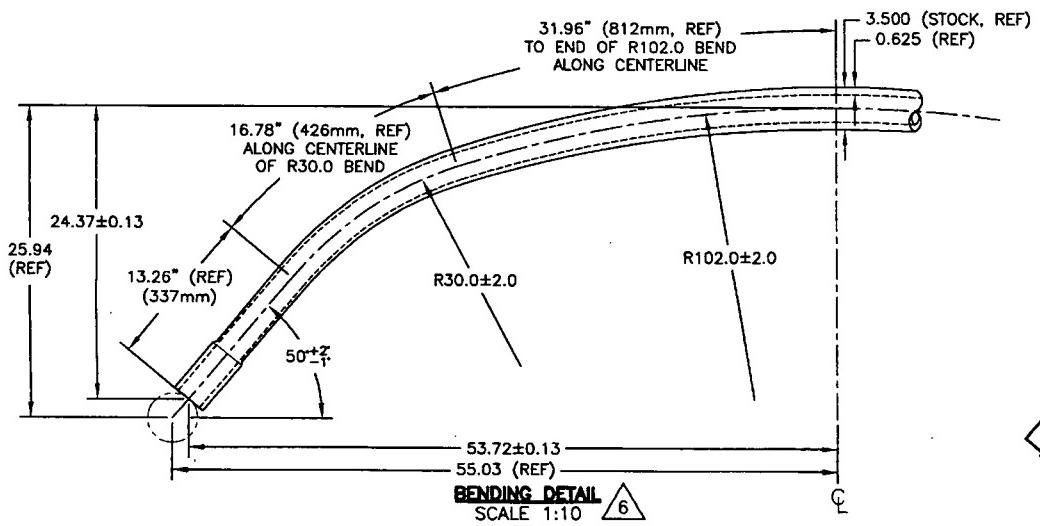
GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6009-129
FINISHED LENGTH = 124.09 ± 0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-600-1009 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

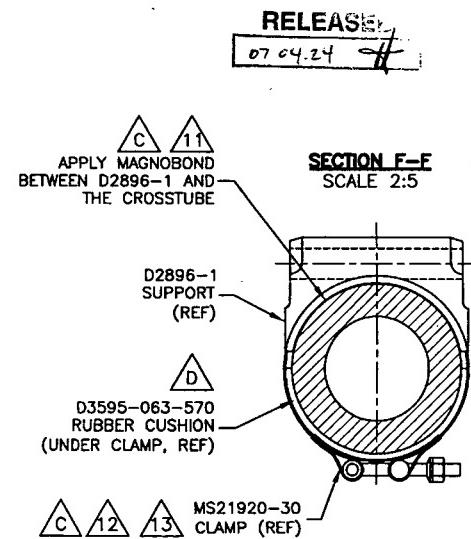
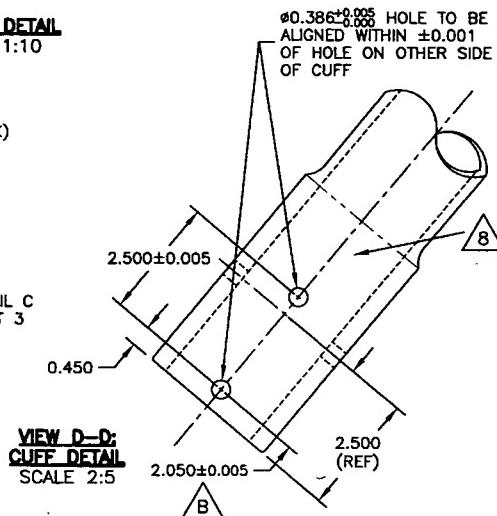
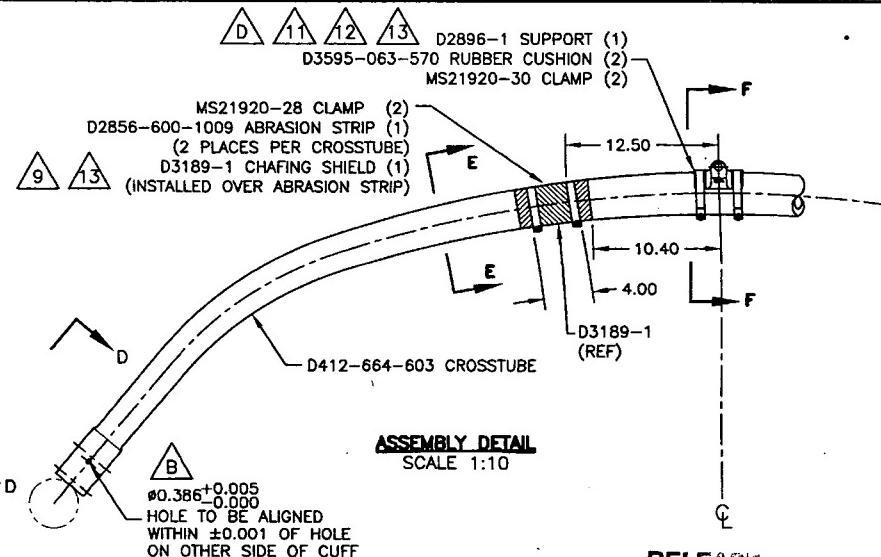
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WITHOUT NOTICE
WORK ORDER
NO. *32229*

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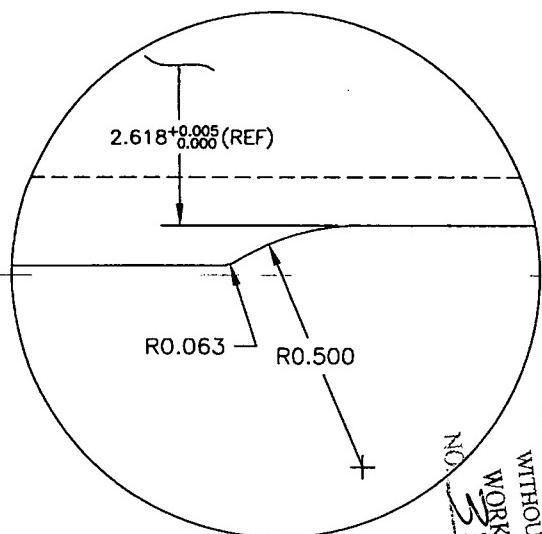
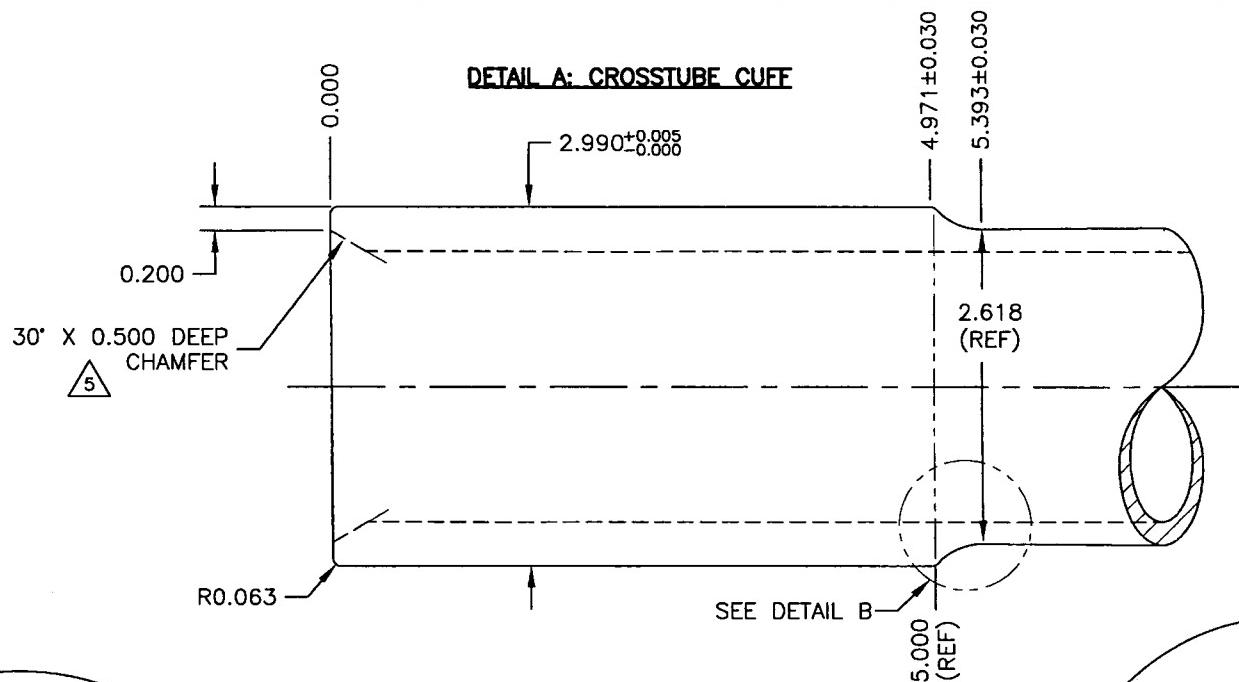
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DART AEROSPACE LTD.

DESIGN PH DRAWN BY PH
CHECKED QP APPROVED HK
DATE 07.03.09

DRAWING NO. D412-664-243
TITLE CROSSTUBE ASSEMBLY (412 HI AFT)

REV. D
SHEET 2 OF 3
SCALE 1:10
DART AEROSPACE LTD.
HAWTHORPE, ONTARIO, CANADA

RELEASED
07-04-2449
PER ECN 899

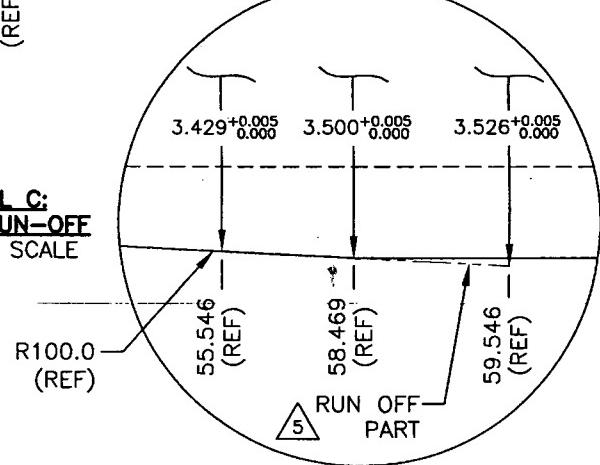


DETAIL B: CUFF TRANSITION
SCALE 4:1

UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER NO. 227

SHOP COPY
RETURN TO
ENGINEERING

**DETAIL C:
TAPER RUN-OFF**
NOT TO SCALE



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DART AEROSPACE LTD.

DESIGN PH

CHECKED J

DATE 07.03.09

DRAWN BY PH

APPROVED H

TITLE CROSSTUBE ASSEMBLY (412 HI AFT)

DART

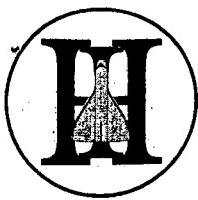
DART AEROSPACE LTD.
HAMILTON, ONTARIO, CANADA

REV. D

SHEET 3 OF 3

SCALE 1:1

DRAWING NO. D412-664-243



HeathAir

INTERNATIONAL (1991) INC.

681 Ave. Lepine, Dorval, Québec H9P 1G3
Tél.: (514) 636-1000 • Fax: (514) 636-0031

W.O. № 36946

A.M.O. Number: 46/90

NON-DESTRUCTIVE TESTING REPORT

AIRCRAFT / COMPONENT INFORMATION

REGISTRATION:

MODEL/TYPE:

SERIAL NUMBER:

TOTAL HR/LDG:

OPERATED BY:

BASED AT:

INSPECTION REQUIREMENTS

Carry out FPI of five (5) cross tubes (external surface) as per ASTM E-1417-05 and the Dart QSI 038, Section 4.1.1 (on file at client) - parts delivered to HeathAir.

- Qty. (1) P/N D412-664-203 S/N B32229
Qty. (2) P/N D212-664-101 S/N's B32675 & B32676
Qty. (1) P/N D206-667-203 S/N B29634
Qty. (1) P/N D058-676-101 S/N B30250

RADIOGRAPHY ULTRASONIC PENETRANT MAGNETIC PARTICLE EDDY CURRENT

INSPECTION REPORT

Fluorescent penetrant inspection was performed in accordance with the above requirements on five (5) cross tubes.

Note: A Level 3 penetrant was substituted for the requested Level 2 (3 is more sensitive)
Ardrox 970P25E Batch #04B503.

Five (5) cross tubes PASSED inspection.

THE MAINTENANCE DESCRIBED ABOVE HAS BEEN PERFORMED IN ACCORDANCE WITH
THE APPLICABLE STANDARDS OF AIRWORTHINESS

INSPECTED BY: _____

DATE

July 31, 2007

INSPECTION STAMP(S)

Not Required

4246

CUSTOMER INFORMATION

CUSTOMER Dart Aerospace

P.O. NUMBER

ADDRESS:

CONTACT NAME:

LABOUR	@	\$
MATERIALS	@	
TRAVEL EXPENSES	@	GST
HOTEL EXPENSES	@	PST

INVOICE NO. TOTAL \$